AIWA®

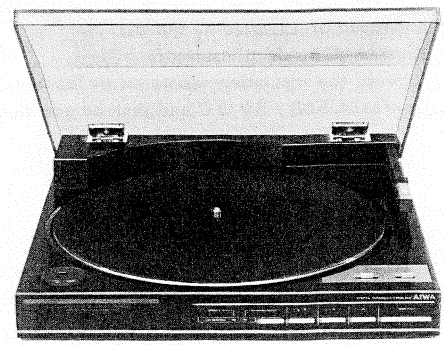
S/M Code No. 86-022
DATE OF ISSUE 5/1986-Z

SERVICE MANUAL

STEREO TURNTABLE SYSTEM

MODEL NO.

LX-330



TYPE. Y

SPECIFICATIONS

<Turntable Section>	
Drive system	Belt drive system
Motor	DC servo motor
Turntable platter	Aluminum alloy diecast
Speeds	33-1/3 and 45 rpm
Wow & flutter	0.055% (WRMS)
S/N ratio	70 dB (DIN-B)
<Tonearm Section>	
Type	Linear tracking type, straight dinamic balanced type
<Cartridge>	
Type	VM type
Frequency response	20—20,000 Hz
Output voltage	2.5 mV (1 kHz, 3,54 cm/sec)

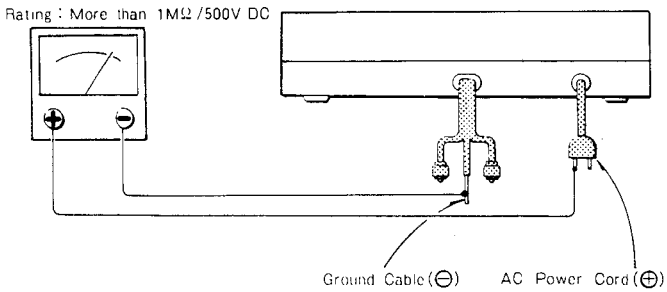
<General>	
Power requirements	DC 12 V, 0.2A
Dimensions	330(W) × 85(H) × 333(D) mm (13″ × 3-3/8″ × 13-1/8″)
Weight	2.6 kg (5.7 lbs.)
Accessories	EP adaptor

- Design and specifications are subject to change without notice.

Follow the instructions carefully, which will allow the user to optimise the products' performance and give many years of serivce.

1. **No scratch and melting shall be made to covered lead-wires of an a.c. primary circuit including mains leads.**
2. **No illegibility shall be given to the specification plate, the caution labels, the fuse labels and others.**
3. **When, on pattern sides of circuit boards, additional repair-parts have been made up, the parts shall be firmly glued to circuit boards or other components, unless the parts can be attached firmly.**
4. **The following matters shall be maintained as they are, when repairing.**
   1) Soldering of lead-wire ends
      * Care should be taken of the space distance in an a.c. primary circuit as well as soldering.
   2) Wiring and holding of lead-wires with wire-clips and binders
   3) Materials of lead-wires
      * e.g.; For UL models, lead-wires to be used shall be approved or accepted by the UL.
   4) Location of all kinds of insulators
5. **After repaired, the insulation resistance or leakage current shall be measured with 500 ± 5V D.C and shall be not less than 1MΩ.**
6. **General instructions for mechanism repair**
   1) Lubricants been stained the surfaces of transmitting portion of the belts, idlers, capstan and pinch roller shall be removed, because slippery and faulty tape travel shall be caused.
   2) When oiling, only one or two drops shall be applied so as not to run over and be dispersed. Note should be taken of the metal fitting for the capstan and rotating portions of the idlers and pinch roller, especially.
   3) E-rings and poly slider washers shall be replaced with new ones, if once those have been removed. — No re-utilization due to unreliability.
   4) Regular spare-parts shall always be used for repair, because using irregular parts and tampering with the products shall cause deterioration, mulfunction and damage.

Measuring Point



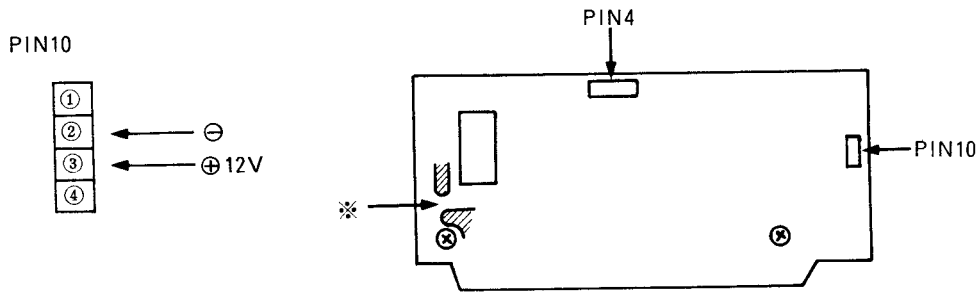
☆ **MEMO** ☆

Preparation for servicing

This unit is using 8 P DIN connector for the power supply and the signal output.
When servicing use MX-330 or MX-440, or make following connections.

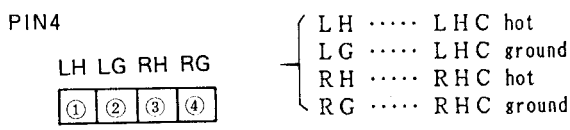
Power supply

+12V→ ③ of PIN10
E → ② of PIN10



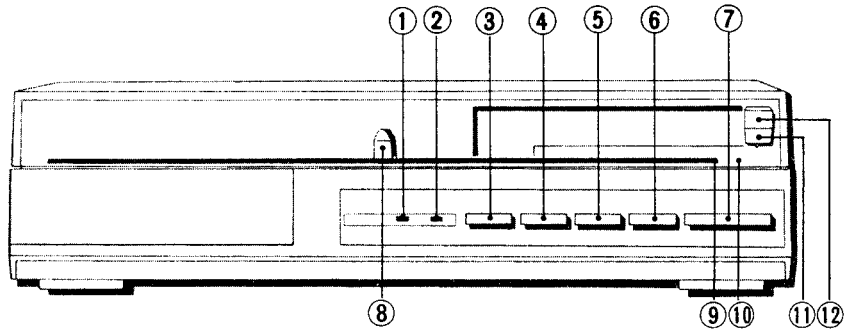
Signal output

Connect pins as follows.



The earth line for the logic circuit and the audio circuit is separated. When checking the audio circuit, connect earth lines at ※, and disconnect it often servicing.

NAMES OF PARTS AND THEIR FUNCTION



1. **OPERATE Indicator**
   Lights up when the tuner power switch is pushed "ON".
2. **Repeat indicator**
   This lights when the REPEAT button is "ON"
3. **REPEAT button**
   Set this to "ON" for repeat play. The repeat function is automatically released after the record has been played 10 times.
4. **Up/down button (▼ ▼)**
   Use this to raise or lower the tone arm from the record surface.
5. **Forward button (◀)**
   Pressing this button for manual operation raises the tonearm and moves it toward the next track. Releasing this button stops the tonearm during its upward movement. Press the Up/down button to start playing.
6. **Reverse button (▶)**
   Pressing this button for manual operation raises the tonearm and moves it toward the previous track. Releasing this button stops the tonearm during its upward movement. Press the Up/down button to start playing.
7. **START/CUT button**
   When this button is pushed, the tone arm automatically moves to the record and descends, and play starts.
   When pushed during play, the tone arm rises and automatically returns to the arm rest, and the platter stops rotating.
8. **Platter shaft**
9. **Rotation speed selector button (SPEED)**
   Select the appropriate rotation speed for the record to be played.
   33 r.p.m. record
   AUTO 33 r.p.m. when the DISC SIZE selector switch is positioned to 30 cm, and 45 r.p.m. when positioned to 17 cm.
   45 r.p.m. record
10. **DISC SIZE selector switch**
    Switch this selector button to the appropriate size for the record to be played.
    30 cm record
    17 cm record
    * For records of other sizes, use manual play.
11. **Cartridge**
12. **Tone arm**

DISASSEMBLY INSTRUCTIONS

1. Removing Bottom Lid

1) Remove the turntable.
2) Remove the 5 screws to detach the bottom lid. (See Figure－1)

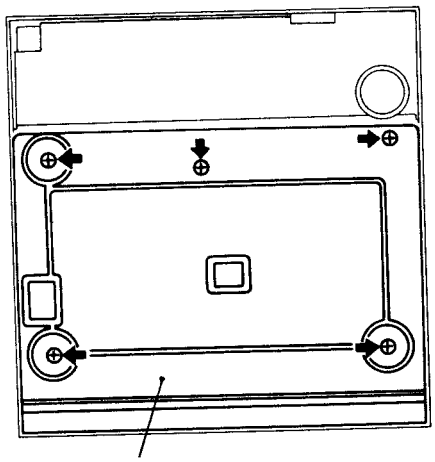


Fig-1

2. Removing Main C.B

1) Remove the 2 screws and unhook the 2 holders. (See Figure－2)

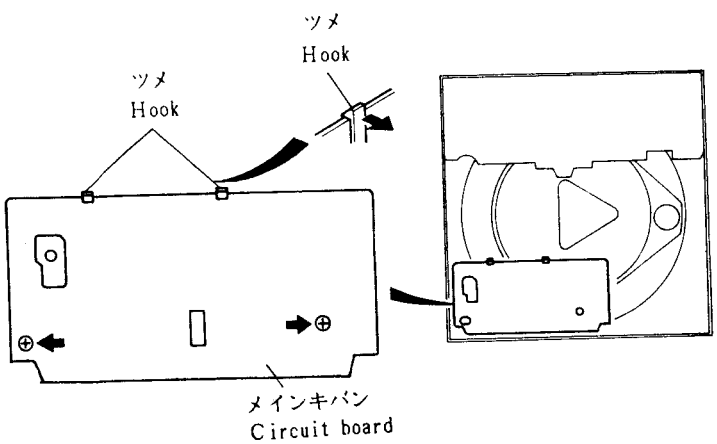


Fig-2

3. Removing Bottom Cabinet

1) Remove the 5 screws. (See Figure－3)

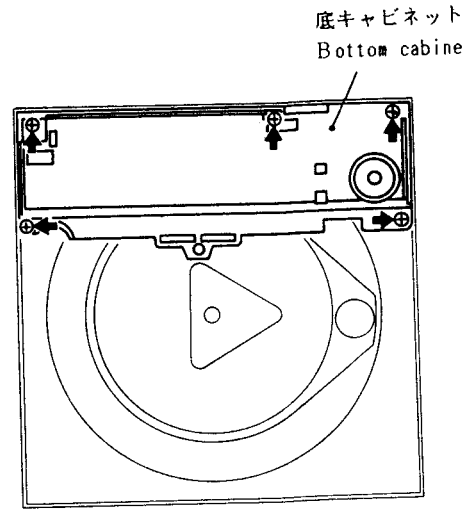


Fig-3

2) Move the tonearm to the illustratid position to detach the main cabinet upward. (See Figure－4)

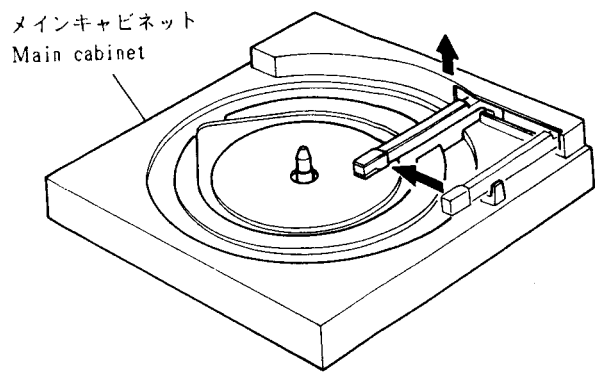


Fig-4

The following check method may be useful for servicing, because these model are provided with no main bottom chassis.

4. C.B. Check by Turntable Operation

1) General operation enables to be performed even though raised the front side of the cabinet by 7～8 cm. So, set the turntable with using of cassette cases as shown and check the circuit board from the component side. (See Figure－5)
Note: Set the turntable flat when performing the adjustments, otherwise correct figures can not be obtained.

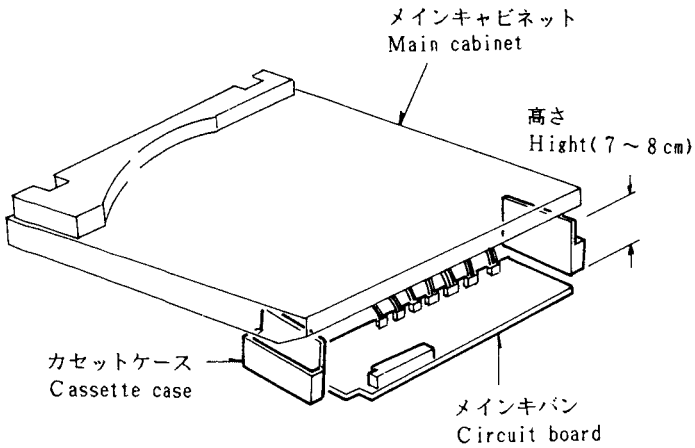


Fig-5

5. Mechanism Part Replacement and C.B. Check by Tonearm Operation (with Turntable Removed)

1) Detach the turntable and turn the cabinet upside down.
2) Remove the mechanism chassis and set it is illustrated, placing in paralled with the circuit board. Take care of the tonearm leadwires, otherwise the tonearm may be stuck. (See Figure－6, 7)

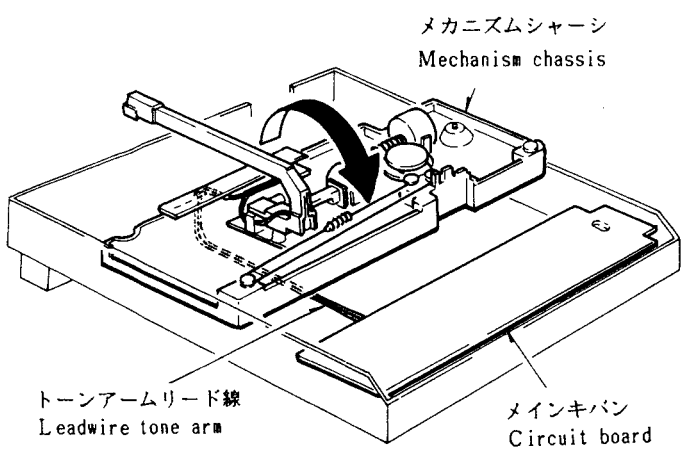


Fig-6

6. Blind Plate Removal

Before performing the adjustment, remove the blind plate because the adjusting pins are situaed underneath this plate. Proceed as follows:
1) Move the tonearm to illustrated position. (See Figure－7)

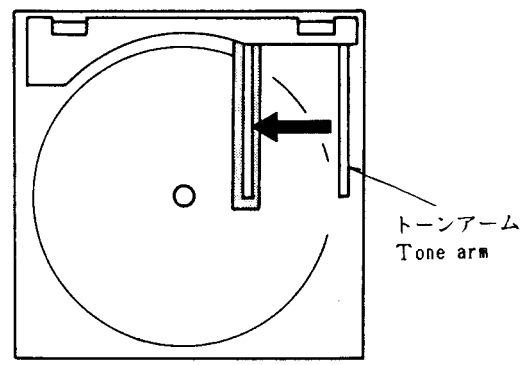


Fig-7

2) Insert a screwdriver into the illustrated openning on the bottom cabinet and push against the blind plate to take off. (See Figure－8)

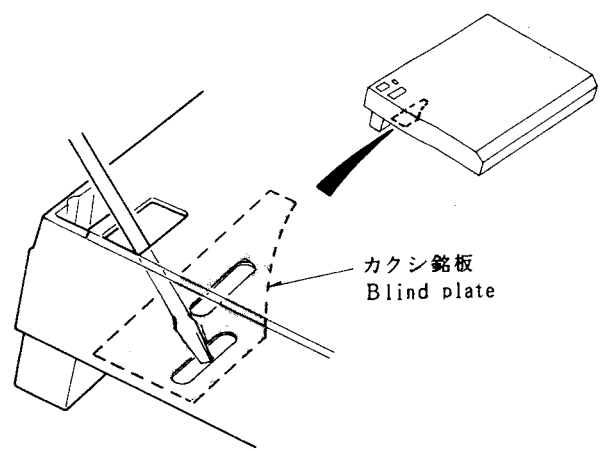


Fig-8

IC TERMINAL DESCRIPTION

IC1, LM6416E PIN EXPLANATION

Pin No.	Symbol	Description
1	UP	Arm-up output. "Low" during arm-up operation.
2	DOWN	Arm-down output. "Low" during arm-down operation.
3	R	Arm rightward-movement output. "Low" during the arm moving rigthward.
4	L	Arm leftward-movement output. "Low" during the arm moving leftward.
5	EXtal	Clock output. 4.5Vp-p 490kHz
6	Xtal	Clock output. 6.0Vp-p 490kHz
7	RMT	Remote control input. Start operation by the fall point of "Low" from "Hight".
8	RESET	Reset input. Reset if "Low".
9	REST	"High" when the arm is on the arm-rest.
10	SYNC	SYNCHRATE output. "Low" after 3 seconds the UP SENS pin turned to "High".
11	RPM	Non connection.
12	PHM	Phono-motor on/off output. Motor running by "Low", and motor stopping by "High".
13	TEST	Test pin to be connected to the ground.
14	Vss	Ground.
15 ~ 17	D0 ~ D2	Key matrix output.
18	D3	Non connection.
19	RPT	Repeat indication output. Lighting when "Low".
20	V_{DD}	+5.5V
21 ~ 24	K0 ~ K3	Key inputs.
25	REST. S	Tonearm position detection output. Detection of the arm-rest position and the end position of 30 and 17 cm discs.
26	POS. S	Tonearm position detection output. Detection of the top position of 30 and 17 cm discs.
27	DOWN. S	Arm-down sensor input. "High" during arm-down.
28	UP. S	Arm-up sensor input. "High" during arm-up.

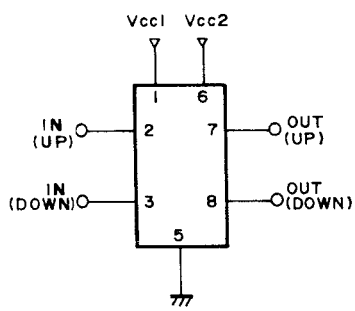
IC TA7354P

IN (UP)	IN (DOWN)	OUT (UP)	OUT (DOWN)	Arm operation
1	0	H	L	UP
0	1	L	H	DOWN
0	0	H	H	Stop
1	1	L	L	Inability

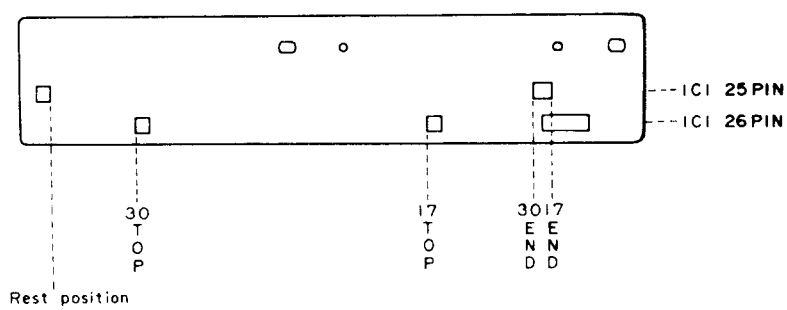
IN PUT			OUT PUT		Remarks
IN SW	IN R	IN L	OUT R	OUT L	
0	1	0	1	0	Forward rotation (during arm UP and movement to the right)
0	0	1	0	1	Reverse rotation (during arm UP and movement to the left)
0	1	1	0	0	Brake
1	0	0	1	0	Analog forward rotation (Not possible in normal operation)
1	0	1	0	1	Analog reverse operation (during arm DOWN operation)

Note) • INsw = 1 Inhibit
• IN_1 = 1
• Oscillation may occur when the brake is applied.

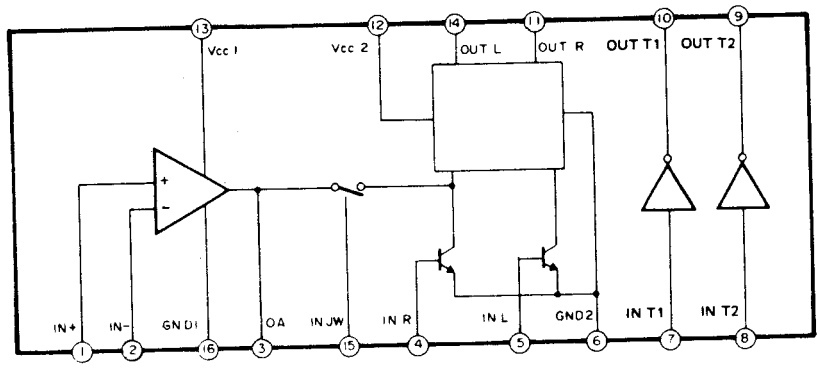
IC TA7354P



POSITION SENSOR



IC M54547



Pin No.	Symbol	Function
1	IN+	Angle sensor input. Voltage rises when arm angle drifts.
2	IN−	Operation arm ⊖ pin.
3	OA	Operation amp output.
4	IN R	Rightward movement input.
5	IN L	Leftward movement input.
6	GND2	GND
7	IN T1	Transistor array input.
8	IN T2	Transistor array input.
9	OUT T2	Transistor array output.
10	OUT T1	Transistor array input.
11	OUT R	Rightward movement output. 3.7V during arm UP and movement to the right.
12	Vcc2	+5.5V
13	Vcc1	+5.5V
14	OUT L	Leftward movement output. 0～3.7V during arm DOWN operation and 3.7V during arm UP, movement to the left.
15	IN SW	Set to "H" during arm DOWN operation and the switch inside IC is set to ON.
16	GND1	GND

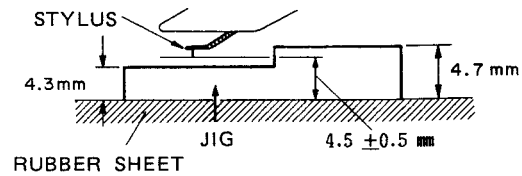
ADJUSTMENT

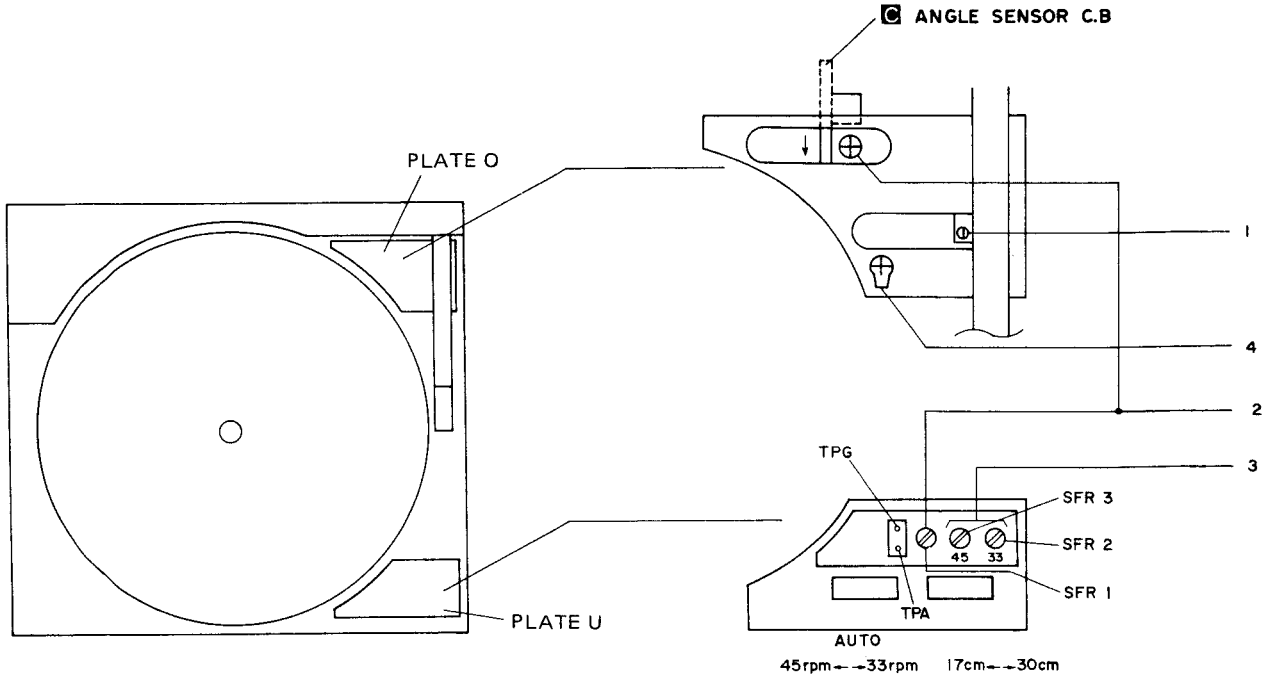
Preparation for adjustment

Adjusting components are covered with two plates ··· Plate O and Plate U. Before performing the following adjustment, remove the plate O, which is under the tonearm, by pushing against with a screwdriver from the bottom side, and take off the plate U, which is on the right hand corner, with a knife.

Plate O ··· Refer to the paragraph of 'Disassembly Instruction'.

Plate U ··· Detach the bottom steel plate to find out the adjusting components on the circuit board, if it is difficult to remove the plate U.





[1] Stylus height adjustment

Remove the belt from the turntable and move the tone arm. Turn the adjusting screw to adjust so that the height of the stylus is 4.5±0.5 mm from the rubber sheet.

[2] Angle sensor adjustment

1. Remove the belt from the turntable and move the tone arm.
2. Turn the adjusting screw so that the C ANGLE SENSOR circuit board is positioned as far as possible toward you. Adjust SFR1 so that the voltages at test points 1 and 2 are 4.5±0.5 at this time.
3. Turn the adjusting screw again to adjust so that the voltage at test point 1 is 1.5V±0.1.
4. Lower the tone arm and check that the voltages at test points TPG and TPA are 1.1±0.2V.

[3] Motor speed adjustment

Play back the 3kHz section of the test record (ATR-003) and adjust SFR2 so that 33 rpm is 3000±5.

Adjust SFR3 so that 45 rpm is 4050±7.

[4] Auto IN/OUT adjustment

Play back the test record (ATR-003) at the speed of 45rpm and turn the adjusting screw to adjust so that IN of the 30 cm record size is set to count 20^{+5}_{-10}. Check that OUT of the 30 cm record size is set to count 11~14. IN of the 17 cm record size is set to count 29±8 and OUT of the 17 cm record size, to count 15~UP in the same way.

ELECTRICAL MAIN PARTS LIST (LX-330)

CAPACITORS No mark, U, UF: μF; P, PF: pF
COILS MMH: mH; UH: μH
FUSE MMA: mA

- +++ mark denotes a component of assembled part which part code is represented by a previously stated component.
- *-mark means less required items and availabilities may be limited.

Ref. No.	Part No.	Description
		=== IC ===
	84-133-610	IC,LM6416E
	87-020-555	IC,M4584BP
	87-020-147	IC,M54547
	87-027-683	IC,TA7325P
	87-020-343	IC,TA7354
		=== TRANSISTOR ===
	89-110-154	TRANSISTOR,2SA1015,Y
	89-318-154	TRANSISTOR,2SC1815,Y
	89-318-464	TRANSISTOR,2SC1846,R
	89-320-011	TRANSISTOR,2SC2001K
	89-414-064	TRANSISTOR,2SD1406Y
		=== MAIN CIRCUIT BOARD SECTION ===
PCB-A	*	MAIN CIRCUIT BOARD
C107	* 87-018-047	CAP,CERA-SOL S 0.01Y/16
C108	* 87-018-047	CAP,CERA-SOL S 0.01Y/16
C109	* 87-018-047	CAP,CERA-SOL S 0.01Y/16
C110	* 87-018-047	CAP,CERA-SOL S 0.01Y/16
C111	* 87-018-047	CAP,CERA-SOL S 0.01Y/16
C113	* 87-018-044	CAP,CERA-SOL S 1000P
C114	* 87-010-367	CAP,ELECT BP S4.7-25V
C115	* 87-010-367	CAP,ELECT BP S4.7-25V
C116	* 87-010-379	CAP,ELECT 16-22SME
C117	* 87-018-044	CAP,CERA-SOL S 1000P
C120	* 87-018-047	CAP,CERA-SOL S 0.01Y/16
C202	* 87-018-036	CAP,CERA-SOL S 220P
C207	* 87-018-036	CAP,CERA-SOL S 220P
D101	87-027-416	DIODE,ZENER HZ3C2
D102	87-020-110	DIODE 1SS177
D103	87-020-110	DIODE 1SS177
D104	87-020-110	DIODE 1SS177
D105	87-020-110	DIODE 1SS177
D107	87-020-110	DIODE 1SS177
D108	87-020-110	DIODE 1SS177
D109	87-020-110	DIODE 1SS177
D110	87-020-110	DIODE 1SS177
D111	* 87-020-377	LED,PG5731KY (OPERATE)
D114	87-020-110	DIODE 1SS177
D115	87-020-110	DIODE 1SS177
D117	87-020-110	DIODE 1SS177
D118	87-020-110	DIODE 1SS177
D119	87-020-110	DIODE 1SS177
D120	87-020-110	DIODE 1SS177
D121	* 87-027-943	LED,PR5751K (REPEAT)
D130	87-027-702	DIODE,ZENER HZ6C2L
D131	87-027-556	DIODE,ZENER HZ11B3
L101	* 87-003-051	CHOKE COIL 470 UH
L102	* 84-133-624	COIL,OSC 490T
R114	* 87-025-310	RES,MF,1W-4.7
SFR1	* 87-021-743	SFR 22K
SFR2	* 87-021-741	SFR 4.7K
SFR3	* 87-021-741	SFR 4.7K
SW1	84-139-631	TACT SW (START/CUT)
SW2	84-139-631	TACT SW (▶ REVERSE)
SW3	84-139-631	TACT SW (◀ FORWARD)
SW4	84-139-631	TACT SW (▼▼ UP/DOWN)
SW5	84-139-631	TACT SW (REPEAT)
SW6	87-031-869	SLIDE SW (DISC SIZE)
SW7	87-031-870	SLIDE SW (SPEED)
		=== POSITION SENSOR CIRCUIT BOARD SECTION ===
PCB-B	*	POSITION SENSOR CIRCUIT BOARD
P12	87-020-342	PHOTO INTERRUPTER GP-2S04 (POS. SENSOR)
P13	87-020-342	PHOTO INTERRUPTER GP-2S04 (POS. SENSOR)
		=== ANGLE SENSOR CIRCUIT BOARD SECTION ===
PCB-C	*	ANGLE SENSOR CIRCUIT BOARD
P11	87-020-150	PHOTO INTERRUPTER KU107 (ANGLE SENSOR)
		=== MISCELLANEOUS ===
	87-085-200	CORD BUSHING
J1	* 84-140-620	DIN PLUG,ASSY,8P (DIN PLUG) (YB ONLY)
J1	* 84-140-622	DIN PLUG,ASSY,8P UL (YUB ONLY)
M1	84-133-614	MOTOR-DC,MMN-S
M2	84-133-613	MOTOR-DC,PON-8(UD)
M3	84-133-634	MOTOR,DC PHONO MMA-6,ASSY
SW8	87-031-871	LEAF SW 1-2 (ARM UP/DOWN)

Note; Combination Circuit Board

The parts on the electrical parts list which are indicated by an asterisk (*) are supplied as one single combined circuit board. Therefore, they will not be supplied separately. If this becomes necessary, please order the entire circuit board.

Conbination circuit board A 84-140-610
PCB-A 84-140-611
Conbination circuit board B 84-133-630
PCB-B 84-133-631
PCB-C 84-133-632

IC handling precaution

IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.

1. Need to be put on conductive sheet, to be put in a metallic box and to be wrapped by aluminium foil for transportation and deposit.
2. To use solder iron less than 40W (less than 260°C) of power consumption for soldering. But do not overheat more than 10 second.
3. Do not perform a conductivity test with a tester, etc. Refer to the circuit voltages of each part.

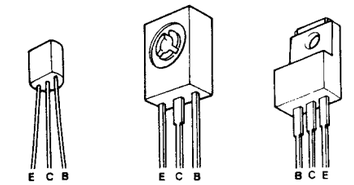
Practical Service Figure

S/N ratio:	More than 60dB (DIN-B)
Wow and flutter:	Less than 0.1% (WRMS)
Output voltage:	200±50mV (1kHz, 5cm/sec)
<CARTRIDGE SECTION>	
Vertical tracking angle:	24 $^{+1}_{-9}$ °
Stylus pressure:	2±0.5g
Channel separation:	More than 18dB (1kHz)
<TONE ARM SECTION>	
Stylus point height:	4.5±1mm
Arm sending speed:	10 $^{+3}_{-2}$ sec
Arm returning speed:	11±3sec

NOTES:

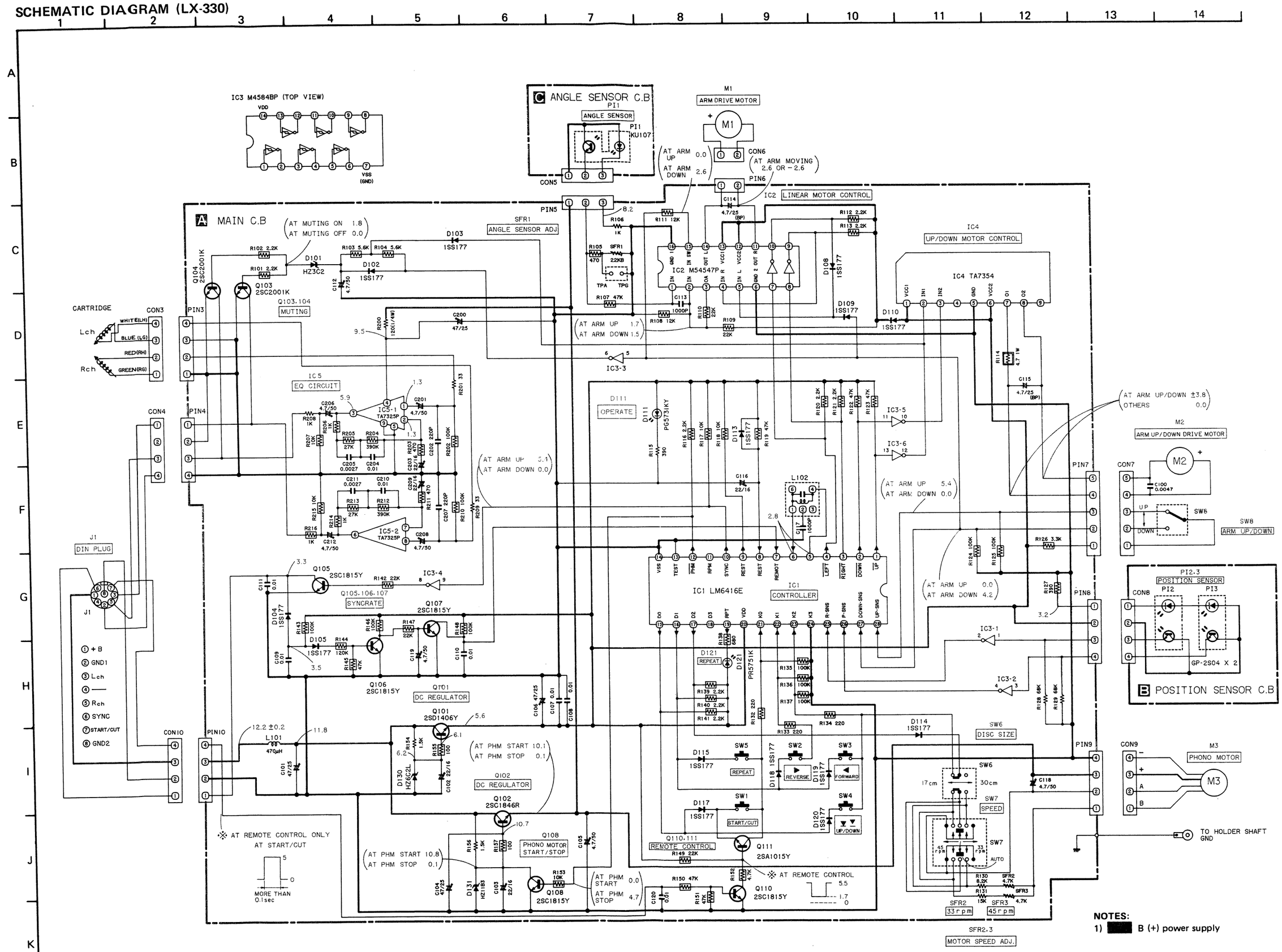
1) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals.
2) Resistors with no designation have a rated power of 1/8W and a tolerance of ±5%.
3) Capacitors with no designation have a dielectric strength of less than 50WV.
4) The only capacitor tolerance indicated are ±5% (J) and ±10% (K).
5) Ceramic capacitor symbols:
   - For temperature compensation (SL)
   - High dielectric constant system (YY)
   - High dielectric constant system (YW, YP, YZ)
   - Semiconductor ceramic
   - For temperature compensation (SH)
6) Explanation of symbols
   - (M) Mylar capacitor
   - (A) Aluminum solid capacitor
   - (PP) Polypropylene film capacitor
   - (BP) Bi-polarized capacitor
   - (LL) Low-leakage capacitor
   - (T) Tantalum capacitor
   - (S) Styrol capacitor
   - Printed resistor
   - Fuse resistor
   - Nonflammable resistor
   - (LN) Low noise resistor

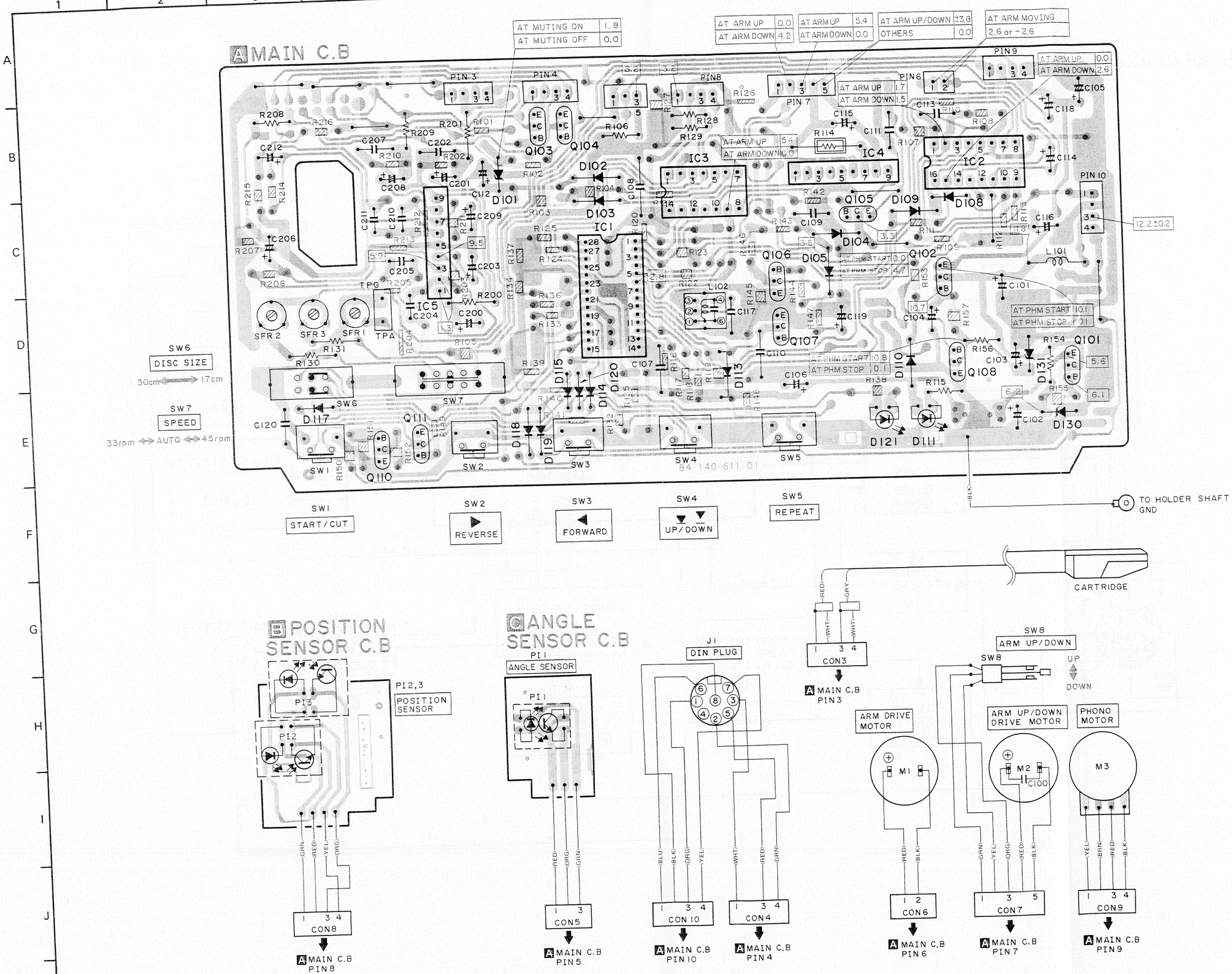
- This schematic diagram is subject to change without notice in the interests of improved performance.



2SA1015
2SC1815
2SC2001
2SC1846
2SD1406

SCHEMATIC DIAGRAM (LX-330)

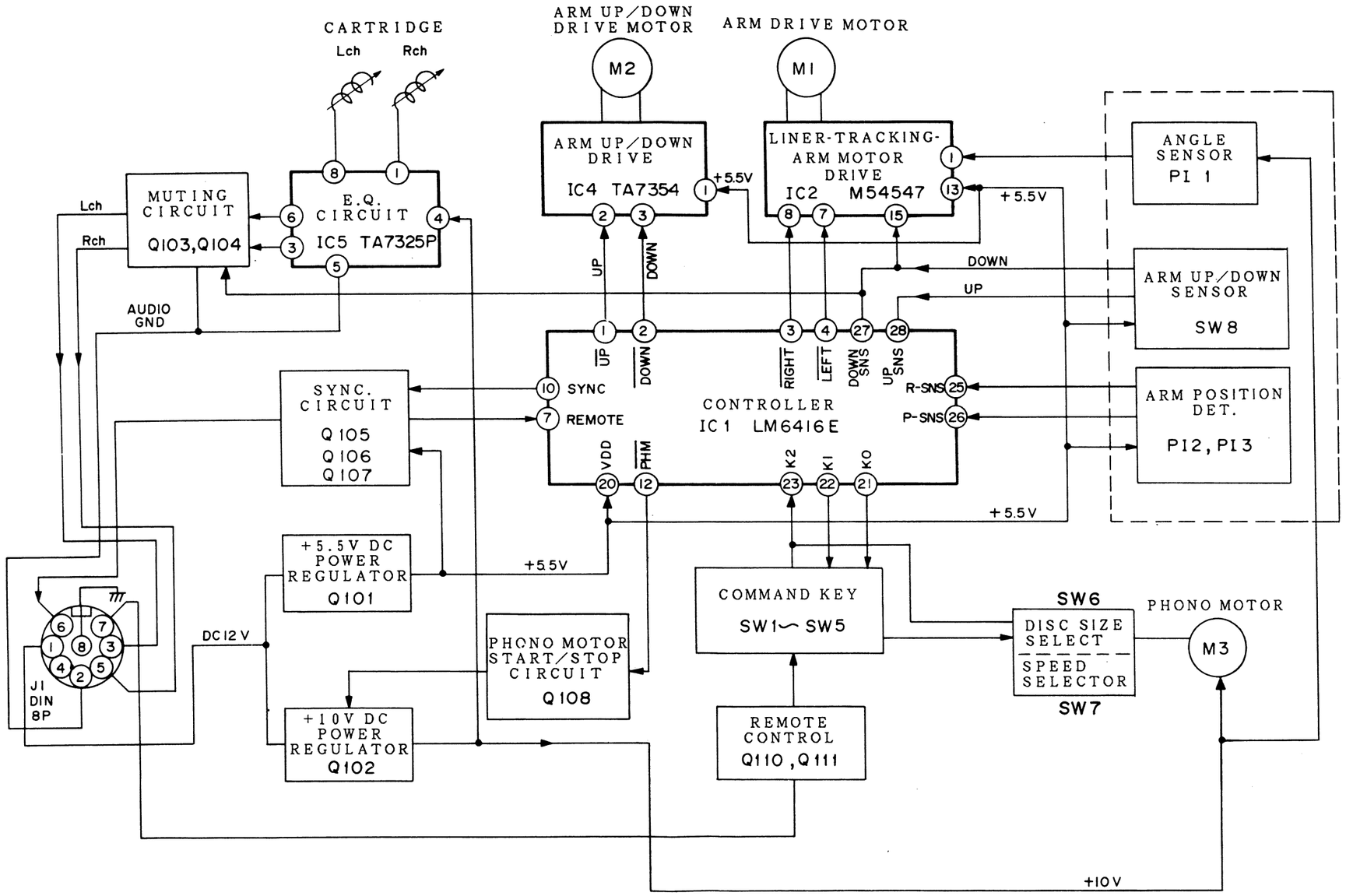




NOTES (1) Printed resistor pattern Others pattern

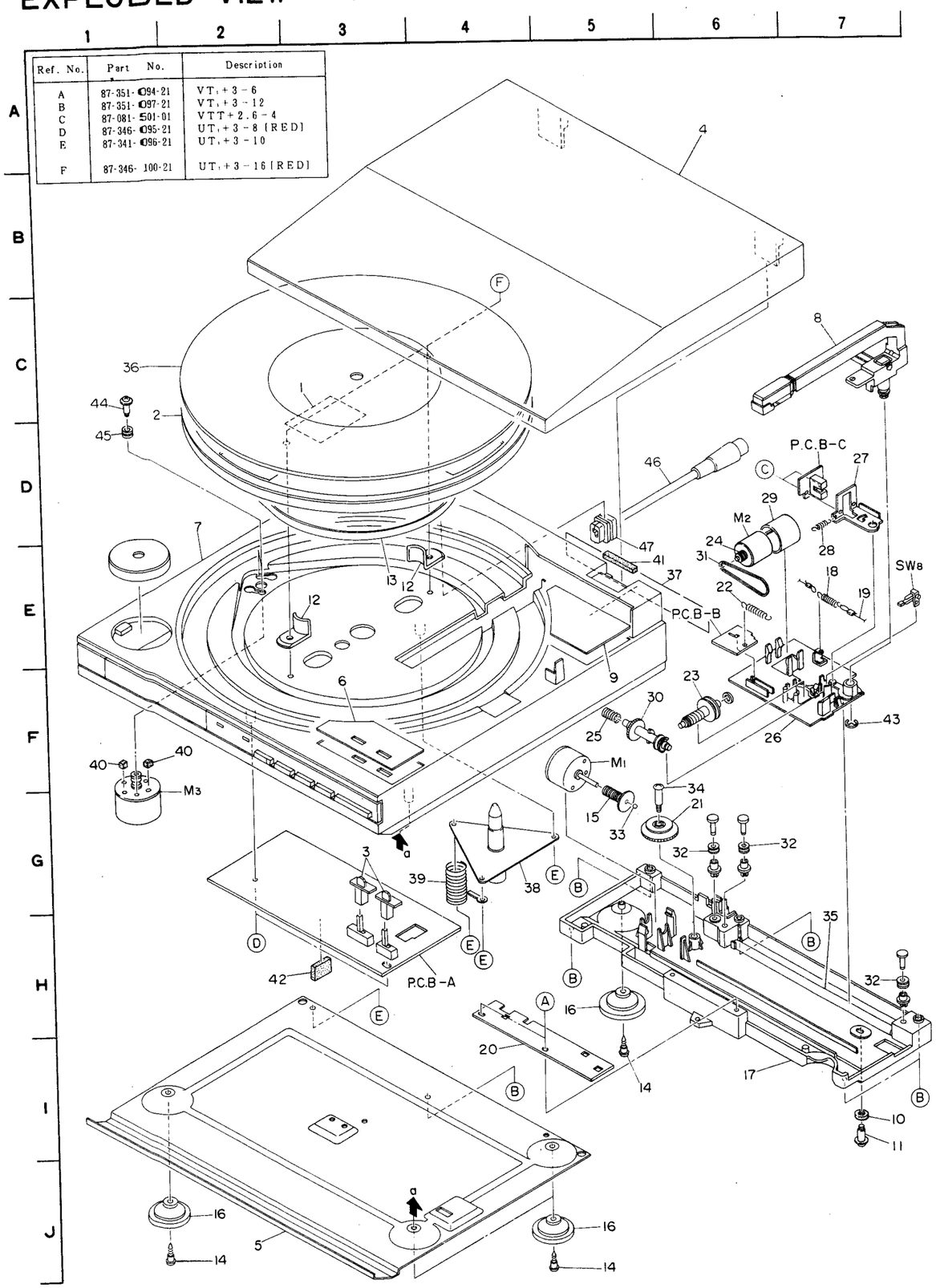
(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.

- BLOCK DIAGR AM (LX-330)



EXPLODED VIEW

Ref. No.	Part No.	Description
A	87-351-[1]094-21	VT₁+3-6
B	87-351-[1]097-21	VT₁+3-12
C	87-081-[5]01-01	VTT+2.6-4
D	87-346-[1]095-21	UT₁+3-8 [RED]
E	87-341-[1]096-21	UT₁+3-10
F	87-346-100-21	UT₁+3-16 [RED]



MECHANICAL PARTS LIST

- ※-mark in this part list shows exclusive part.
- ★-mark means less required items availabilities may be limited.
- No avalilability part is warked with- - -in Part No. list.

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	1	---	CAUTION TAG		1
	2	★84-133-008	TURN TABLE	LX-30	1
	3	★84-133-009	KNOB, SPEED	LX-30	2
	4	★84-141-003	DUST COVER Ass'y F		1
	5	---	BOTTOM CABINET		1
	6	★84-140-009	PLATE U	※	1
	7	★84-140-025	MAIN CABINET HB Ass'y	※	1
	8	★84-140-101	TONE ARM Ass'y	※	1
	9	★84-135-013	PLATE O(B) U	LX-20	1
	10	---	RUBBER CUSHION 4-10-1.5		1
	11	★84-124-238	TRANSPORTATION SCREW	LX-70	1
	12	---	SPACER T. T		2
	13	84-133-213	RUBBER BELT T. T	LX-30	1
	14	★84-133-223	HEADER SCREW, RUBBER FOOT	LX-30	4
	15	84-139-210	WORM GEAR RE	LX-770	1
	16	★84-139-008	RUBBER FOOT	LX-770	4
	17	---	BOTTOM CABINET		1
	18	★84-139-214	E-SPRING, MECHANISM	LX-30	1
	19	★84-133-229	WIRE ROPE	LX-30	1
	20	---	PLATE A, MASK		1
	21	84-139-208	PULLEY A, WORM	LX-770	1
	22	★84-123-238	E-SPRING, SENSOR		1
	23	84-124-204	GEAR A, WORM	LX-70	1
	24	84-127-206	MOTOR PULLEY S	LX-110	1
	25	★84-131-208	C-SPRING	LX-120	1
	26	★84-133-205	MECHANISM CHASSIS Ass'y	LX-30	1
	27	---	LEVER A		1
	28	★84-133-217	E-SPRING, P	LX-30	1
	29	---	PLATE B, MOTOR		1
	30	★84-133-221	CAM A, UP-DOWN	LX-30	1
	31	82-439-342	BELT, COUNTER		1
	32	★87-071-019	ROLLER ø7		3
	33	★87-073-006	STEEL BALL 3		1
	34	84-133-222	HEADER SCREW	LX-30	1
	35	★84-133-215	PIPE	LX-30	1
	36	★84-130-013	RUBBER SHEET (Y only)		1
		★84-133-023	RUBBER SHEET (YU only)	LX-30	1
	37	---	SPEC. PLATE		
	38	★84-140-201	SHAFT HOLDER Ass'y F	※	1
	39	★84-141-201	C-SPRING, EARTH		1
	40	---	CUSHION 6-6-2		2
	41	---	SPACER 12-3-1.0		1
	42	---	G CUSHION 18-4-12		1
	43	★87-067-171	STE-6		1
	44	★87-081-483	M2.6 MOTOR SCREW		2
	45	★87-087-029	RUBBER CUSHION		2
	46	★84-140-620	DIN PLAG Ass'y 8P (Y only)	※	1
		★84-140-622	DIN PLAG Ass'y 8P UL (YU only)	※	1
	47	★87-085-200	CORD BUSHING 2104		1

■ ACCESSORIES/PACKAGE LIST

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty	
	1	★84-140-904	INSTRUCTION BOOKLET	※	1	
	2	★84-190-978	4 5 ADAPTER S BLACK		1	

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